

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B65D 63/16	A1	(11) International Publication Number: WO 99/18005 (43) International Publication Date: 15 April 1999 (15.04.99)
(21) International Application Number: PCT/SE98/01789 (22) International Filing Date: 5 October 1998 (05.10.98) (30) Priority Data: 9703637-0 6 October 1997 (06.10.97) SE (71) Applicant (for all designated States except US): AB BIWEX [SE/SE]; P.O. Box 71, S-533 21 Götene (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): AHLGREN, Ove [SE/SE]; Hultets Gård, S-461 91 Trollhättan (SE). (74) Agents: WILLQUIST, Bo et al.; Willquist & Partners Patent- byrå AB, S:t Larsgatan 23, S-582 24 Linköping (SE).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>
(54) Title: LOCKING DEVICE <div data-bbox="328 1155 1235 1402" data-label="Image"> </div> (57) Abstract <p>The invention relates to a device in a bundle tie. This comprises an elongated tie part (2) of a certain width and thickness, which at one end has an elongated insertion part (3) of lesser width than the tie part (2) and at its other end has a locking head (1) with a through-opening (6) for the tie part (2). The opening has essentially the same width as the tie part (2), but a height greater than the thickness of the tie part (2). In one transverse wall of the opening is a slit (7), the width of which is such that it allows the insertion part (3) to be inserted into the opening (6) via the slit (7), forming a tie loop, interacting elements designed to lock the tie part (2) in relation to the locking head (1) being provided on the tie part (2) and in the locking head (1). The said locking elements take the form of a tongue (8) which, emerging from the bottom of the opening (6) at one end of the opening (6), extends approximately diagonally towards the other end of the opening (6) and towards the slit (7). The locking elements are designed to positively and detachably interlock in one another.</p>		

BEST AVAILABLE COPY

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

WO 99/18005

PCT/SE98/01789

1

Locking device

Device in a bundle tie comprising an elongated tie part of a certain width and thickness, which at one end has an elongated insertion part of lesser width than the tie part and at its other end has a locking head with a through-opening for the tie part, which has essentially the same width as the tie part but a height greater than the thickness of the tie part, and a slit in one transverse wall of the opening, the width of which is such that it allows the insertion part to be inserted into the opening via the slit, forming a tie loop, interacting elements designed to lock the tie part detachably in relation to the locking head being provided on the tie part and in the opening of the locking head.

The application of the design defined above in order to produce a bundle tie is exemplified in Swedish patent No. 9404328-8, publication No. 503217. This known design, however, has inherent disadvantages, which to a large extent limit the use thereof, because of inadequate technical characteristics and for cost reasons, especially on the manufacturing side, due to high tooling costs and other time-consuming manufacturing problems that increase costs. In addition to lower costs, there is also a desire to achieve better technical characteristics, especially greater ease of use, without having to sacrifice the locking efficiency. Moreover, new technical characteristics are sought, such as easy release and opening of the lock of a fitted bundle tie which is applied by placing it around a cable bundle, for example, and tightened in order to reduce the space required for the cable bundle. Tightening intensifies the locking action, making easy release or opening of the tie fundamentally impossible. When wishing to release or open known bundle ties, this generally leads to the tie being destroyed by cutting it open.

The object of the present invention is to effect these desired improvements and remove the above-mentioned disadvantages in the device defined in the introductory part.

The present invention achieves this object in the device specified in the introductory part in that the said locking elements take the form of a tongue, extending approximately diagonally from the bottom of the opening at one end of the opening towards the other end of the opening and towards the slit, and that the said elements are designed to positively interlock in one another.

WO 99/18005

PCT/SE98/01789

2

According to a particular characteristic, the tongue extends out through the hole to form a release part. The locking elements on the tongue and on the tie take the form of locking teeth, or alternatively the locking elements on the tongue take the form of at least one locking projection and the locking elements on the tie take the form of a number of locking recesses designed to interact with the locking projection. The locking elements can also be a combination of locking teeth, locking projections and locking recesses. The tie has an insertion part of essentially the same width as the groove-shaped recess. At the free end of the insertion part there is also a gripper strip, the width of which is greater than the width of the opening.

By means of the present invention a bundle tie is obtained with very many different possible applications wherever it is desirable to effect locking or catching between the tie part and the lock head. The device according to the present invention with a tongue-shaped locking element extending approximately diagonally through the through-hole in the housing from the bottom is extremely effective and can be used in many contexts. This permits free rotation of the locking element in the hole passing through the housing independently of the walls surrounding it, which permits a more effective engagement with a tie inserted into the housing via the groove-shaped recess. The combination of the so-called open housing and the tongue arranged therein and extending diagonally from the bottom confers many advantages compared to previously known designs.

Embodiments of the present invention will be described in more detail below with reference to the drawings attached, in which figure 1 shows a top view of a bundle tie with an embodiment of a device according to the present invention. Figure 2 shows a longitudinal section through the tie in figure 1. Figure 3 shows a view of a part of a bundle tie with a device according to another embodiment of the present invention. Figure 4 shows a section through the device in figure 3. Figure 5 shows a section through a part of a bundle tie with a device according to a further embodiment of the present invention. Figure 6 shows a side view of the bundle tie in figure 5, partially in section.

The embodiments of a bundle tie according to the present invention shown in figures 1 and 2 comprises a housing part 1, a tie part 2, an insertion part 3 of smaller width than the tie part 2, and an end part 4 serving as gripper strip. The length of the tie part 2 is in principle arbitrary, like the length of the insertion part 3, which should, however, be at least as long as the housing 1. The end part 4 has a width greater than the tie part 2 and

WO 99/18005

PCT/SE98/01789

3

on at least one side is provided with ridges 5 to facilitate gripping of the part when tightening the tie, for example around a cable bundle or the like. The end part 4 has a further important function. Because its width prevents it running through the hole 6, it is easily possible, by bringing the insertion part 3 down in the recess 7, to produce a loop that loosely surrounds a bunch of cables, for example. Where necessary, further cables can be fed in through this loop before the bundle tie is tightened. The housing 1 is provided with a through-hole 6, which extends in the longitudinal direction of the housing and across the tie parts 2-4. A groove-shaped recess 7 extends through the upper wall of the housing and has a width matched to the insertion part 3 and outwardly bevelled edges, which can also be regarded as guide edges for guiding the insertion part 3 down into the through-hole 6. A locking element in the form of a tongue 8 is arranged in the through-hole 6. The tongue 8 emerges from the bottom of the through-hole 6 and extends essentially diagonally towards the opposite end of the hole 6 and towards the groove-shaped recess 7. On the side facing the groove-shaped recess 7 the tongue 8 is provided with a number of locking teeth 9, which are intended to interact with corresponding locking teeth 10 on the tie part 2. The locking teeth 10 extend between edge sections 11 and 12 and are, as it were, sunk in the tie section 2. The edge sections 11 and 12 extend out past the opposite surface of the tie part 2 for the purpose of reinforcing the tie and prevent release of the engagement between the locking teeth 10 and the locking teeth 9. The edge sections may, if necessary, be provided with friction elements for interaction with suitable friction elements on the inside of the through-hole 6 on both sides of the groove-shaped recess 7. After inserting the tie part 3 into the through-hole 6 on top of the tongue 8, the latter will be pressed down towards the bottom 6 and thereafter rebound in order to secure the interlocking engagement between the teeth 9 and 10. It must be noted in particular that the form and fastening position of the tongue in the hole 6 mean that the interlocking engagement between the locking teeth 9 and 10 increases with increasing tensile force in the bundle tie 2.

It will be clearly seen from figure 1 that the tongue 8 is altogether freely resilient inside the through-hole 6, which largely facilitates and ensures the engagement between the locking teeth 9 and 10. The edge sections 11 and 12 also ensure guiding of the tie part 2 inside the through-hole 6 on either side of the tongue 8, which relieves the pressure on the walls of the housing 1 on each side of the tongue 8.

The embodiment shown in figure 3 and 4 of the present invention essentially corresponds to the embodiment shown in figure 1 and 2, except that the tongue is

WO 99/18005

PCT/SE98/01789

4

provided with a release part 13, which allows the tongue 8 to be easily bent down, thereby freeing the locking teeth 9 from engagement with the locking teeth 10 on the tie part 2. Figure 3 further illustrates that the walls in the through-opening 6 may slope down towards the bottom, which thereby becomes somewhat narrower, advantageously creating somewhat thicker walls on each side of the through hole 6. The embodiment shown in figure 5 and 6 corresponds, broadly speaking, to the previous embodiments, except that the release part 13 is somewhat smaller and the tongue 8 is provided with a locking projection 14, which is provided for engagement in a recess 15 in the tie part 2. The locking projection 14 in conjunction with the recesses 15 provides a significantly more secure interlocking engagement

The embodiments of the present invention described above can preferably be made of any plastic material.

Many modifications of the embodiments described above are obviously possible within the framework of the idea of the invention defined in the following claims.

WO 99/18005

PCT/SE98/01789

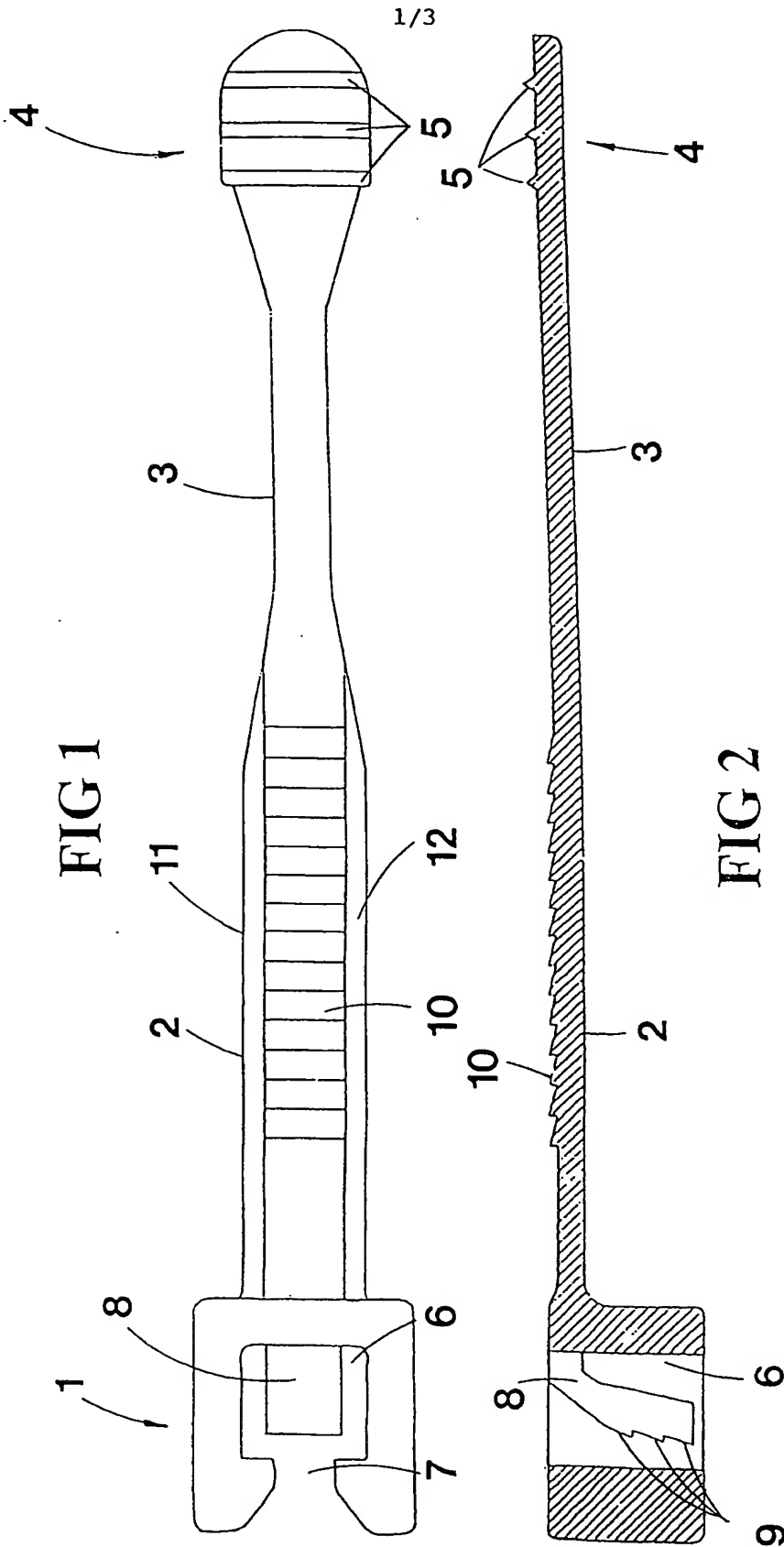
5

Claims

1. Device in a bundle tie comprising an elongated tie part (2) of a certain width and thickness, which at one end has an elongated insertion part (3) of lesser width than the tie part (2) and at its other end has a locking head (1) with a through-opening (6) for the tie part (2), that has essentially the same width as the tie part (2) but a height greater than the thickness of the tie part (2), and a slit (7) in one transverse wall of the opening, the width of which is such that it allows the insertion part (3) to be inserted into the opening (6) via the slit (7), forming a tie loop, interacting elements designed to lock the tie part (2) in relation to the locking head (1) being provided on the tie part (2) and in the locking head (1), **characterised in that** the said locking elements take the form of a tongue (8) which, emerging from the bottom of the opening (6) at one end of the opening (6) extends approximately diagonally towards the other end of the opening (6) and towards the slit (7), and that the said elements are designed to positively and detachably interlock in one another.
2. Device according to claim 1, **characterised in that** the tongue (8) extends out through the opening 6 to form a release part (13).
3. Device according to any of claims 1 - 2, **characterised in that** the said elements (9) on the tongue (8) and on the tie part take the form of interlocking teeth.
4. Device according to any of claims 1 - 2, **characterised in that** the said elements on the tongue (8) take the form of at least one locking projection (14) and that the friction elements on the tie (2) take the form of a number of locking recesses (15) for interaction with the locking projection (14)
5. Device according to claims 3 and 4, **characterised in that** the said elements are a combination of both locking teeth (9, 10), locking projection (14) and locking recess (15)
6. Device according to any of the preceding claims, **characterised in that** a gripper strip(4), the width of which is greater than the width of the opening (6), is provided in the free end of the insertion part (3).

WO 99/18005

PCT/SE98/01789



WO 99/18005

PCT/SE98/01789

FIG 4

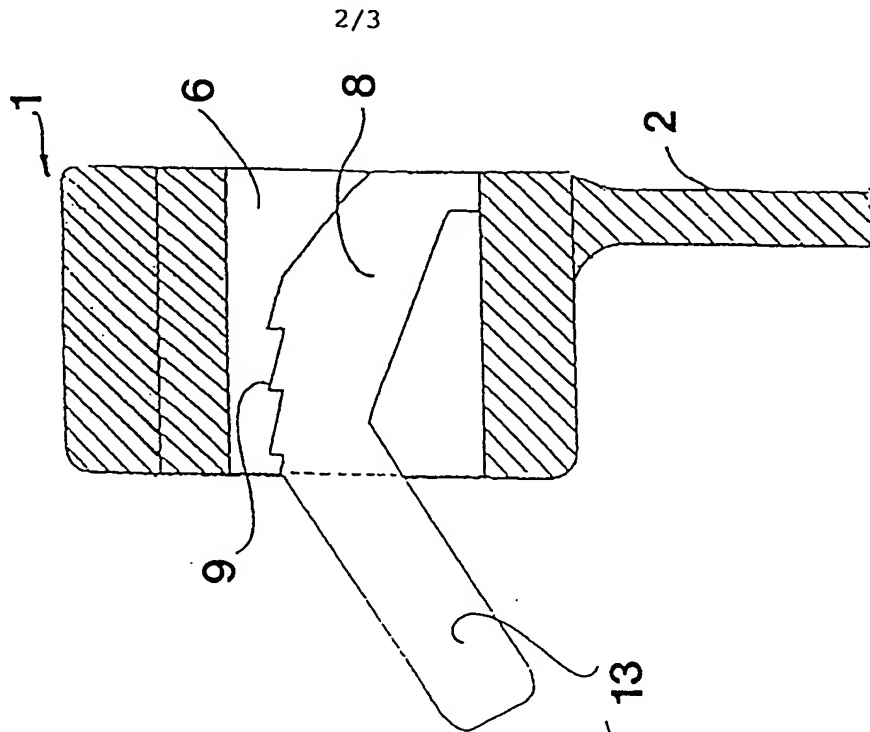


FIG 3

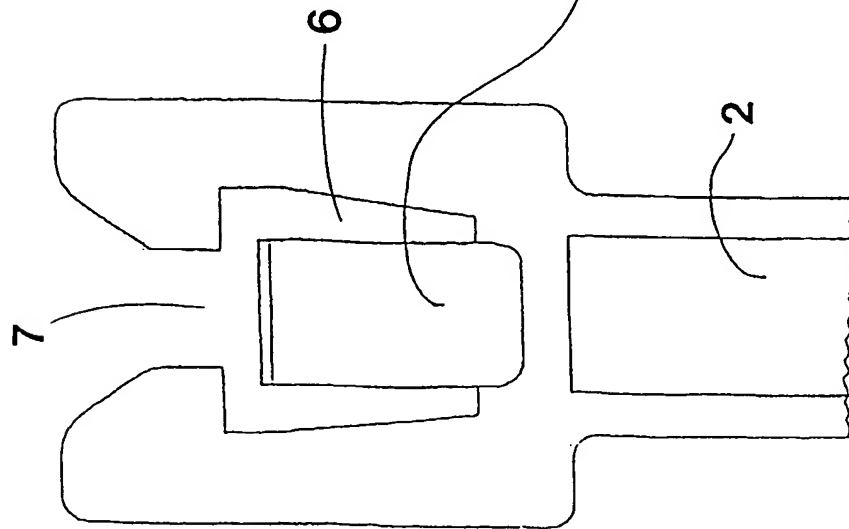


FIG 6

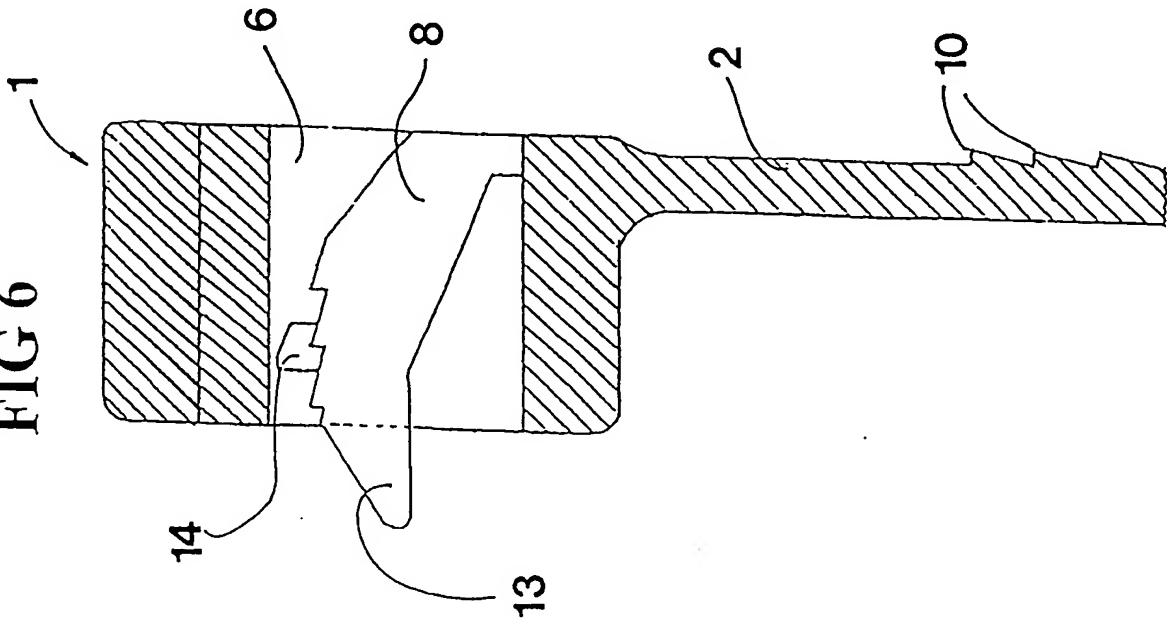
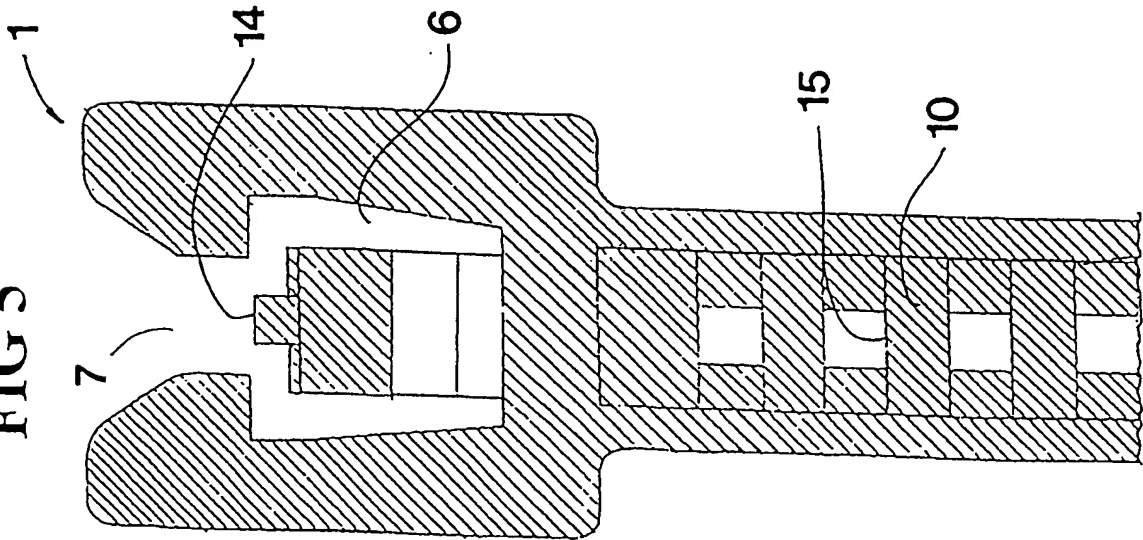


FIG 5



1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 98/01789

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B65D 63/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 2528724 A1 (APARELLAJE ELECTRICO S.A.), 26 February 1976 (26.02.76), claim 1 --	1-6
A	SE 367803 B (THOMAS & BETTS CORPORATION), 10 June 1974 (10.06.74), page 6, line 10 - page 7, line 16, figures 2,4,7-9 --	1-6
A	US 3908233 A (CAVENEY ET AL), 30 Sept 1975 (30.09.75), column 6, line 50 - column 7, line 4, figure 9 -----	1-6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier document but published on or after the international filing date
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

11 January 1999

Date of mailing of the international search report

18 -01- 1999

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Inger Löfgren
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SE 98/01789

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
DE	2528724	A1	26/02/76	NONE	
SE	367803	B	10/06/74	BE 756222 A DE 2046011 A FR 2062181 A GB 1276044 A NL 7013717 A US 3576054 A	16/03/71 15/04/71 25/06/71 01/06/72 19/03/71 27/04/71
US	3908233	A	30/09/75	CA 979623 A CH 532511 A DE 2032858 A FR 2054139 A GB 1316862 A	16/12/75 15/01/73 21/01/71 16/04/71 16/05/73

This Page is inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ BLACK BORDERS
- ☒ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☐ BLURED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☒ COLORED OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REPERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images
problems checked, please do not report the
problems to the IFW Image Problem Mailbox**